PATENT

Docket No.: 100111090-4
Appl. Ser. No.: 10/697,699

IN THE CLAIMS:

Please find below a listing of all of the pending claims. The statuses of the claims are set forth in parentheses.

1. (Currently amended) A method for cooling a room configured to house a plurality of computer systems, said method comprising:

providing a plurality of heat exchanger units configured to receive air from said room and to deliver air to said room;

supplying said plurality of heat exchanger units with cooling fluid from an air conditioning unit;

cooling said received air through heat exchange with the cooling fluid in the plurality of heat exchanger units;

sensing temperatures at one or more locations in said room; [[and]]

controlling at least one of the temperature of said cooling fluid and said air delivery by said plurality of heat exchanger units to said room in response to said sensed temperatures at said one or more locations; and

manipulating the workload on the plurality of computer systems to optimize energy efficiency in cooling said plurality of computer systems.

2. (Previously Presented) The method according to claim 1, wherein said step of controlling at least one of a temperature of said cooling fluid and said air delivery to said room comprises varying an output of said air conditioning unit to control the temperature of said cooling fluid.

3 and 4. (Canceled).

5. (Original) The method according to claim 1, further comprising:

determining whether the sensed temperatures at one or more locations in said room are within a predetermined range.

6-8. (Canceled).

9. (Original) The method according to claim 5, further comprising:

varying the cooling fluid temperature in response to the sensed temperatures at one or more locations in said room being outside of said predetermined range.

10. (Original) The method according to claim 9, further comprising:

increasing said cooling fluid temperature in response to a sum of the sensed temperatures at one or more locations being below said predetermined range.

11. (Original) The method according to claim 9, further comprising:

decreasing said cooling fluid temperature in response to a sum of the sensed temperatures at one or more locations being above said predetermined range.

12-17. (Canceled).

18. (Currently amended) A system for cooling a room containing one or more computer systems, said system comprising:

a plurality of heat exchanger units configured to receive cooling fluid through a cooling fluid line from an air conditioning unit for cooling the cooling fluid, said plurality of heat exchanger units being further configured to receive air through openings in the plurality

PATENT

Docket No.: 100111090-4
Appl. Ser. No.: 10/697,699

of heat exchanger units, wherein said air is cooled through heat transfer with said cooling fluid in the plurality of heat exchanger units;

said plurality of heat exchanger units having at least one fan configured to cause air to flow into and flow out of the heat exchanger unit;

a heat exchanger controller operable to control a supply of said cooling fluid to said plurality of heat exchanger units and operable to control the speed of the at least one fan;

one or more temperature sensors for sensing temperatures at one or more locations in the room; [[and]]

an air conditioning unit controller configured to operate the air conditioning unit to vary the temperature of said cooling fluid delivered to the one or more locations in the room; and

wherein the air conditioning unit controller is configured to manipulate the workload on the plurality of computer systems by varying the locations where the workload is performed to optimize energy efficiency in cooling said plurality of computer systems.

19. (Previously Presented) The system according to claim 18, wherein said heat exchanger controller is configured to receive environmental condition information from said one or more temperature sensors.

20. (Canceled).

21. (Previously Presented) The system according to claim 18, wherein said computer systems are housed in a plurality of racks, and wherein said plurality of heat exchanger units are positioned at various locations in said room to supply air flow to said plurality of racks in a substantially independent manner.

4

PATENT

Docket No.: 100111090-4
Appl. Ser. No.: 10/697,699

22 and 23. (Canceled).

24. (Original) The system according to claim 18, wherein said cooling device comprises at least one of a variable capacity compressor, a heat exchanger, a chiller, and a cooling device controller configured to control said at least one of said variable capacity compressor, said heat exchanger, and said chiller.

25-29. (Canceled).

30. (Currently amended) A system for cooling computer systems housed in one or more racks, said racks being maintained in a room, said system comprising:

a plurality of means for receiving air from the room, said plurality of means for receiving air being located at various locations of the room;

a plurality of means for cooling the received air in the plurality of means for receiving air, said plurality of means for cooling including means for receiving cooling fluid from an air conditioning unit;

a plurality of means for delivering cooled air to said computer systems;

means for measuring temperatures at one or more locations in said room;

means for controlling delivery of said cooled air through said plurality of means for delivering cooled air in response to the temperature measurements; [[and]]

means for controlling the temperature of said cooling fluid; and

means for manipulating the workload on the plurality of computer systems to optimize energy efficiency in cooling said plurality of computer systems.

PATENT

Docket No.: 100111090-4
Appl. Ser. No.: 10/697,699

31. (Original) The system according to claim 30, further comprising:

means for controlling delivery of cooling fluid through said cooling means.

32. (Previously Presented) The method according to claim 5, wherein the step of controlling at least one of the temperature of said cooling fluid and said air delivery by said plurality of heat exchanger units comprises manipulating one or more of the plurality of heat exchanger units to increase air delivery to locations in the room having temperatures above the predetermined temperature range.

33. (Previously Presented) The method according to claim 5, wherein said computer systems are housed in a plurality of racks, said method further comprising:

manipulating the plurality of heat exchanger units to supply air flow to said plurality of racks in a substantially independent manner with respect to each other.

34. (Currently amended) The method according to claim [[16]]1, wherein the step of manipulating the workload on the plurality of computer systems to optimize energy efficiency in cooling said plurality of computer systems further comprises aggregating the workload to a location in the room, said method further comprising:

manipulating one or more of the plurality of heat exchanger units to increase air delivery to the location in the room where the workload is placed.

PATENT

Docket No.: 100111090-4
Appl. Ser. No.: 10/697,699

35. (Currently amended) The method according to claim [[16]]1, wherein the step of manipulating the workload on the plurality of computer systems comprises separating the workload to various locations of the room, said method further comprising:

manipulating one or more of the plurality of heat exchanger units to increase air delivery to the various locations of the room where the workload is placed; and

manipulating one or more of the plurality of heat exchanger units to decrease air delivery to the one or more locations from where the workload was removed.

36. (Currently amended) The system according to claim 18, ~~wherein the cooling device controller is configured to manipulate the workload on the plurality of computer systems by varying the locations where the workload is performed to optimize energy efficiency in cooling said plurality of computer systems, and~~ wherein the heat exchanger unit controller is configured to manipulate one or more of the plurality of heat exchanger units based upon the manipulation of the workload.

37. (Previously Presented) The system according to claim 30, further comprising:

means for manipulating one or more of the plurality of means for receiving air to increase air delivery to locations in the room having temperatures above a predetermined temperature range.

38. (Previously Presented) The system according to claim 30, further comprising:

means for manipulating the plurality of means for receiving air to supply air flow to said plurality of racks in a substantially independent manner with respect to each other.

PATENT

Docket No.: 100111090-4
Appl. Ser. No.: 10/697,699

39. (Currently amended) A computer readable storage medium on which is embedded one or more computer programs, said one or more computer programs implementing a method for cooling a room configured to house a plurality of computer systems, said one or more computer programs comprising a set of instructions for:

supplying a plurality of heat exchanger units configured to receive air from the room and to deliver air to said room with cooling fluid from an air conditioning unit;

cooling said received air through heat exchange with the cooling fluid in the plurality of heat exchanger units;

sensing temperatures at one or more locations in said room; [[and]]

controlling at least one of the temperature of said cooling fluid and said air delivery by said plurality of heat exchanger units to said room in response to said sensed temperatures at said one or more locations; and

manipulating the workload on the plurality of computer systems to optimize energy efficiency in cooling said plurality of computer systems.

40. (Previously Presented) The computer readable storage medium according to claim 39, said one or more computer programs further comprising a set of instructions for:

manipulating one or more of the plurality of heat exchanger units to increase air delivery to locations in the room having temperatures above a predetermined temperature range.

41. (Previously Presented) The computer readable storage medium according to claim 39, said one or more computer programs further comprising a set of instructions for:

manipulating the plurality of heat exchanger units to supply air flow to said plurality of racks in a substantially independent manner with respect to each other.

42. (New) The system according to claim 18, wherein the air conditioning unit controller is configured to aggregate the workload to a location in the room, wherein the heat exchanger controller is configured to manipulate one or more of the plurality of heat exchanger units to increase air delivery to the location in the room where the workload is placed.

43. (New) The system according to claim 18, wherein the air conditioning unit controller is configured to separate the workload to various locations of the room, and wherein the heat exchanger controller is configured to manipulate one or more of the plurality of heat exchanger units to increase air delivery to the various locations of the room where the workload is placed and to manipulate one or more of the plurality of heat exchanger units to decrease air delivery to the one or more locations from where the workload was removed.